
* NOT MEASUREMENT *

* SENSITIVE *

KKK-S-2851

February 11, 1994

SUPERSEDING

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28 February 1989

FEDERAL SPECIFICATION

SEMITRAILERS, REFUSE COLLECTION, COMPACTION TYPE: COMMERCIAL

This specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE

1.1 Scope. This specification covers commercial, compaction type, refuse collection semitrailers.

1.2 Classification. Semitrailers are of the following types, as specified (see 6.2):

- Type I - See 6.6
- Type II - Tandem axle, 50 cubic yards (yd3) (38.2 cubic meters (m3))
- Type III - See 6.6
- Type IV - Tandem axle, 65 yd3 (49.6 m3)
- Type V - Tandem axle, 75 yd3 (57.3 m3)

*Beneficial comments (recommendations, additions, deletions) and any

*pertinent data which may be of use in improving this document should be

*addressed to: Commanding Officer (Code 156), Naval Construction Battalion

*Center, 1000 23rd Avenue, Port Hueneme, CA 93043-4301, by using the

*Standardization Document Improvement Proposal (DD Form 1426) appearing at

*the end of this document or by letter.

FSC 2330

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

Federal Standard

FED-STD-297 - Rustproofing of Commercial (Nontactical) Vehicles

Military Specification

MIL-P-514 - Plates, Identification, Instruction and Marking, Blank

Military Standards

MIL-STD-1223 - Nontactical Wheeled Vehicles Treatment, Painting, Identification Marking and Data Plate Standards

MIL-STD-1474 - Noise Limits for Military Materiel (Metric)

MIL-STD-1595 - Qualification of Aircraft, Missile and Aerospace Fusion Welders

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents and publications. The following other Government documents and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

Department of Transportation (DoT):

Federal Motor Vehicle Safety Standards and Regulations

Federal Motor Carrier Safety Regulations

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

Federal Regulations

Occupational Safety and Health Administration (OSHA):

(The Code of Federal Regulations (CFR) is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. When indicated, reprints of certain regulations may be obtained from the Federal Agency responsible for issuance thereof.)

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2.2 Other publications. The following documents form a part of this document to the extent specified herein. The issues are those cited in the solicitation (see 6.2).

American Society of Mechanical Engineers (ASME):

ASME Boiler and Pressure Vessel Code (BPVC)
Section IX, - Qualification Standard for Welding and Brazing
Procedures, Welders, Brazers, and Welding and Brazing Operators

(Application for copies should be addressed to the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, NY 10017.)

ASTM:

ASTM B 117 - Salt Spray (Fog) Testing

(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

American Welding Society (AWS):

AWS B2.1 - Welding Procedure and Performance Qualification
AWS D1.1 - Structural Welding Code-Steel

(Application for copies of AWS publications should be addressed to the American Welding Society, 2501 NW 7th Street, Miami, FL 31025.)

The European Tyre and Rim Technical Organisation (ETRTO):

Standards Manual

(Application for copies of the ETRTO publication should be addressed to the European Tyre and Rim Technical Organisation, 32, Avenue Brugmann, 1060 Brussels, Belgium.)

Society of Automotive Engineers, Inc. (SAE):

SAE J318 - Air Brake Gladhand Service (Control) and Emergency (Supply)
Line Couplers - Trucks, Truck-Tractors, and Trailers
SAE J534 - Lubrication Fittings
SAE J560 - Seven-Conductor Electrical Connector for Truck-Trailer
Jumper Cable
SAE J682 - Rear Wheel Splash and Stone Throw Protection
SAE J700 - Upper Coupler Kingpin - Commercial Trailers and
Semitrailers
SAE J702 - Brake and Electrical Connection Locations - Truck-Tractor
and Truck-Trailer
SAE J1292 - Automobile, Truck, Truck-Tractor, Trailer, and Motor Coach
Wiring

(Application for copies should be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.)

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Tire and Rim Association, Inc. (TRA):

TRA Yearbook

(Application for copies should be addressed to the Tire and Rim Association, Inc., 175 Montrose West Avenue, Suite 150, Copley, OH 44321.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Description. The semitrailer shall be a compaction type equipped with an all metal box type construction body, forward hopper area, gasoline or diesel-engine-driven hydraulic pump system and rear discharge.

3.1.1 Standard commercial product. The semitrailer shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this specification but which are a part of the manufacturer's standard commercial product, shall be included in the semitrailer being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs, or brochures, and represents the latest production model.

3.2 First production vehicle. The contractor shall furnish a semitrailer for first production vehicle inspection.

3.3 General design.

3.3.1 Federal Motor Vehicle Safety Standards. The semitrailer shall comply with DoT Federal Motor Vehicle Safety Standards and Regulations in effect at time of manufacture.

3.3.2 Net weight. The net weight of the fully equipped semitrailer shall be the minimum practicable for the service intended.

3.3.3 Gross vehicle weight (GVW). The GVW shall consist of the net weight and the payload, as specified in 3.3.4, evenly distributed within the load area.

3.3.4 Volumes and payloads. Volumes and payloads shall conform to Table I for specified type of semitrailer.

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TABLE I. Volumes and payloads.

-----*				
*	Type			*
-----*				
*	II	IV	V	*
-----*				
* Net volume of refuse body, yd3	50	65	75	*
* (not less than)	(38.2 m3)	(49.6 m3)	(57.3 m3)	*
-----*				
* Volume of compaction portion yd3	34	49	55	*
* (not less than)	(26 m3)	(37.4 m3)	(42 m3)	*
-----*				
* Refuse payload capacity, lb	24,000	36,000	36,000	*
* (not less than)	(10 900 kg)	(16 350 kg)	(16 350 kg)	*
-----*				

3.3.5 Weight distribution. The proportion of the GVW to be supported on axle suspensions, measured at the ground, shall not exceed 34,000 pounds (15 400 kilograms (kg)) per axle.

3.3.6 Dimensions and clearances. The semitrailer, uncoupled from truck tractor, resting level on ground with the landing legs down, and without payload, shall conform to the dimensions and clearances specified in Table II.

3.3.7 OSHA and FMCSR Regulations. The vehicle, with furnished attachments, accessories and equipment, shall comply with all OSHA and FMCSR regulations. Regulations shall be those applicable to a commercial user of such a similar type, class and size of semitrailer for the same general use.

3.3.8 Dissimilar metals. All dissimilar metals used throughout the vehicle shall be insulated from one another to prevent galvanic or electrolytic action.

3.3.9 Prohibited materials. Asbestos materials shall not be used in any form in any part of the vehicle. No item (part of assembly) shall contain radioactive materials in which the specific activity is greater than 0.002 microcuries per gram.

3.3.10 Accessibility. The design of the vehicle and optional equipment shall permit access for routine servicing, replacement and adjustment of component parts and accessories with minimal disturbance of other components and systems.

3.3.11 Safety. All equipment or exposed portions of the equipment which are subject to extreme temperatures and inclement weather and all rotating or reciprocating parts which are of such nature or so located as to become a hazard to operating personnel shall be insulated, fully enclosed or properly guarded.

3.4 Performance. The semitrailer, fully equipped and loaded with the specified payload (see 3.3.4), shall be capable of being towed at speeds of not less than 10 miles per hour (mph) (16 kilometers per hour (km/h)) over unimproved roads (see 6.5), and over reasonably hard uneven terrain; and of being towed at speeds of not less than 55 mph (88 km/h) over improved roads.

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The semitrailer shall be capable of traveling 55 mph (88 km/h), unloaded, over improved roads.

3.4.1 Turning ability. The semitrailer shall be capable of assuming a 90 degree angle to the coupled towing vehicle without cramping, or damage to the semitrailer or the towing vehicle.

TABLE II. Dimensions and clearances.

	Type		
	II	IV	V
Overall length, inches (not more than)	480 (12 192 mm)	480 (12 192 mm)	480 (12 192 mm)
Overall width, inches (not more than)	96 (2400 mm)	96 (2400 mm)	96 (2400 mm)
Overall height, inches (not more than)	150 (3810 mm)	156 (3960 mm)	162 (4120 mm)
Ground clearance, inches (not less than)	9 (230 mm)	9 (230 mm)	9 (230 mm)
Swing radius, from centerline of kingpin to most distant point on semitrailer nose, inches (not more than)	52 (1320 mm)	59 (1490 mm)	59 (1490 mm)
Distance from centerline of kingpin to front end of semitrailer, inches (not less than)	18 (460 mm)	18 (460 mm)	18 (460 mm)
Turning clearance from the centerline of kingpin to any portion of semitrailer 6 inches (150 mm) or more below upper fifth wheel plate, inches (not less than)	84 (2130 mm)	84 (2130 mm)	84 (2130 mm)
Upper fifth wheel height, from the ground to underside of plate, inches +/-1 inch (25 mm)	48 (1220 mm)	51 (1295 mm)	48 (1220 mm)

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3.4.4 Accessibility. The design of the vehicle and optional equipment shall permit access for routine servicing and shall permit access for replacement and adjustment of component parts and accessories with minimal disturbance of other components and systems.

3.5 Chassis frame and body structure. The semitrailer shall be the chassis frame type. Frame and body shall be an electrically welded, all steel, general constructed, integral unit. The rated payload (see 3.3.4) and the sprung weight of the semitrailer shall not impose a fiber stress greater than 50 percent of the yield strength of the materials used when the semitrailer is operating under mobile operating conditions specified in 3.4. The chassis main frame shall extend the full length of the body and may be used as guidance members for the packer plate, shall be combined with sufficient number of cross members to insure stability, and may be spliced at the front to provide a gooseneck platform for mounting the auxiliary power source.

3.5.1 Stress analysis. A stress analysis for the semitrailer, loaded as specified in 3.3.3, shall be performed. The stress analysis shall include shear and moment diagrams and deflection calculations. The strength of the floor, cross members, and outside frame members shall not be included in calculations to compute the main frame maximum fiber stress; but the weight of the floor, cross members, and outside frame members imposed on the main frame shall be included in the total load imposed on the main frame. Stress calculations shall include complete analysis of the frame depth transition to over the fifth wheel area, floor, cross members, longitudinal frame members and tiedown devices.

3.5.2 Body. The body configuration shall be the manufacturer's standard box shape with the hopper (loading space) and opening located at the forward end of the semitrailer. The body sides, top, and forward end shall be fabricated of not less than 0.1046-inch (2.657 millimeters (mm)) (U.S. revised standard gage No. 12) thick high tensile steel, and the floor fabricated of not less than 0.1345-inch (3.416 mm) (U.S. revised standard gage No. 10) thick high tensile steel. The floor area beneath the hopper opening shall be provided with support equivalent to 3 inch (75 mm) pressed steel or structural steel channels placed on centers not exceeding 12 inches (300 mm), and shall withstand a load of not less than 500 pounds per square foot area (2430 kilograms per square meter) without deformation. The compaction area, extending from the rear of the hopper opening to the rear of body, shall withstand the maximum pressure exerted by the packer plate upon the refuse without permanent deformation. The edges around the hopper opening shall be framed and reinforced to resist denting by heavy objects dumped inside and withstand bumps encountered during loading operations. The interior surfaces of the body shall be smooth to expedite ejection and cleaning operations. The body shall have a minimum of two rows of retaining teeth in the top inside of the body to prevent rubbish from falling forward after compaction stroke. A means shall be provided for prevention of immobilization of the packer due to wedging of materials between the top of the packer plate and the roof of the body. The entire body shall be liquid-tight to a height of not less than 5 inches (125 mm).

3.5.2.1 Hopper. The hopper opening shall extend across the top and straight downward along each side to provide a loading height of not more than 120 inches (3050 mm) in order to facilitate loading from either side of semitrailer. Side openings shall be the full length of the hopper and may be accomplished by means of hinged doors. The capacity of the hopper shall be such that the contents of

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a standard refuse container of not less than 12 yd³ (9.2 m³) volume may be emptied without overflow to the outside and without shaking, packing, tamping, or undue movement of either semitrailer, container, or container handling device. Unless otherwise specified (see 6.2), the size of the hopper opening shall be not less than 80 inches (2030 mm) wide by 100 inches (2540 mm) long.

3.5.2.2 Hopper cover(s). Unless otherwise specified (see 6.2), power operated hopper cover(s) which completely cover the hopper opening and remain tightly closed during vehicle travel shall be provided. When power operated cover or covers are furnished, the open or close cycle shall be not more than 30 seconds.

3.5.2.3 Rear discharge door(s). The top or hinged rear discharge door(s) shall open an unrestricted opening for ejecting the refuse. The door(s) shall be reinforced to prevent deformation which may cause leaks between door(s) and body during packing operation. The rear door(s) shall be provided with heavy-duty cam type or wedge type latches and heavy-duty hinges. The latches shall hold the door(s) securely in locked position. The latching mechanism shall be actuated by a single lever except that, when double doors are provided, a single lever actuator may be used for each door. Latch actuating levers shall be readily operable by a man standing on the ground. The hinges shall keep the door(s) tightly aligned to prevent leakage resulting from packer plate compacting the refuse. When power operated top hinged discharge door is furnished, the open or close cycle shall be not more than 30 seconds.

3.5.2.4 Discharge spillage. When necessary, provisions shall be provided to prevent discharge refuse from spilling forward around wheels and collecting on suspension components.

3.5.2.5 Packer plate. The packer plate shall be actuated by double acting, telescopic, hydraulic cylinder assembly, and have a travel length extending from the forward end of the hopper to the rear discharge door(s). The packer plate shall be so shaped as to cause the packing side to force the refuse to be simultaneously compacted rearward and upward; closely fit the cross sectional dimensions of the compacting area to preclude bypassing refuse; and be guided to prevent scraping and gouging of the body inside walls. When maximum pressure is applied or released, no permanent misalignment shall be evident.

3.5.2.6 Packer plate operation. The packer plate operation for compacting and ejecting refuse shall conform to the following:

- a. The complete compaction cycle, comprised of the packer plate movement from the initial station at the loading hopper to any intermediate position and return, shall be accomplished in not more than 2 minutes.
- b. The complete ejection cycle, composed of the packer plate movement from the initial station at the loading hopper to the final location at the discharge door opening and return, shall be achieved in not more than 2.5 minutes.
- c. The packer plate unit pressure force range shall be from a minimum of 2.5 pound-force per square inch (psi) (118 kilopascals (kPa)) up to not less than 8.5 psi (159 kPa) predicted upon variance in force

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(product of pressure and area) exerted by the smallest and largest inside diameter (proportionate area) cylinders of the telescoping hydraulic cylinder assembly, operating pressure of the hydraulic pump less head losses, and packer plate area.

- d. The packer plate shall completely expel the total volume (maximum rated payload) of refuse without external assistance (manual raking or pulling of body contents).
- e. The packer plate action, from the extreme final position at the loading hopper to the extreme final position at the discharge door(s), shall be achieved in a single continuous sweep.

3.5.3 Power source. Power source for hydraulic equipment operation shall be a standard commercial, water cooled, diesel engine. Engine shall have sufficient horsepower and torque to operate packer plate as specified herein and shall be equipped with all necessary accessories enclosed in a weatherproof housing, including the following: electric starting, alternator and regulator, battery, air cleaner, oil filter, muffler, throttle, governor, fuel pump, fuel tank, spark arrester, charging indicator, oil pressure indicator, and coolant temperature indicator. The engine shall be arranged with a device which automatically accelerates the engine speed during packing operations which embodies means for adjusting the degree of acceleration. The noise level generated by the power source shall not exceed 85 decibels (reference pressure 0.0002 microbars) measured at the operator's station as per MIL-STD-1474, category D, or the equipment shall be placarded, "Warning - Noise Hazard Area - Hearing Protection required when power unit is in operation." The auxiliary engine exhaust system or the hydraulic system shall be shielded so that, in the event of a hydraulic line rupture or hydraulic fluid leak, the hydraulic fluid will not come into contact with any part of the vehicle exhaust system.

3.5.3.1 Engine hour meter. An engine hour meter having a totalizing mechanism of not less than 9,999 hours, shall be furnished to register accurately the number of hours of engine operating time. Meter shall be of rugged construction to insure continuous trouble-free performance under the most extreme equipment operating conditions indicated in this specification.

3.5.4 Hydraulic system. The hydraulic system shall include as a minimum the components specified herein.

3.5.4.1 Hydraulic pump. The hydraulic pump shall have a rated output capacity (volumetric delivery and operating pressure) to permit fulfilling of the requirements specified in 3.5.2.2, 3.5.2.3, and 3.5.2.6.

3.5.4.2 Protective devices. The hydraulic system shall embrace overload protective device(s) (relief valves) for setting the limit of maximum operating pressure to prevent damaging the constituent hydraulic components. To prevent over travel, limit control devices shall be provided, where necessary to automatically stop the movement of packer plate at both ends of travel.

3.5.4.3 Hydraulic cylinders. The hydraulic cylinders shall be the manufacturer's current standard size (inside diameter and lengths) and fitted with seals to prevent entrance of foreign matter and to preclude leakage of hydraulic fluid. All exposed hydraulic cylinder piston rods, when in the fully

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extended position, shall be hard chromium plated with sufficient thickness to withstand 30-hour salt spray test in accordance with ASTM B 117.

3.5.4.3.1 Telescopic cylinders. The double acting, telescopic cylinders for actuating the packer plate shall fulfill the following requirements:

- a. Demonstrate continuous sweep action within the allotted time specified in 3.5.2.6(a), (b), and (e).
- b. Develop sufficient power to enable the packer plate to exert the pressure force specified in 3.5.2.6(c).
- c. Furnished with fixed anchor (adjustable traveling anchor is not acceptable).

3.5.4.3.2 Single cylinders. Each set of double acting single unit cylinder(s) for operating the hopper cover(s) and top hinged discharge door (when furnished), shall meet at least the following requirements:

- a. Exhibit continuous movement within the allotted time during open or close cycle specified in 3.5.2.2 and 3.5.2.3.
- b. Each cylinder shall be provided with a fixed anchor.

3.5.4.4 Reservoir and filters. The hydraulic fluid reservoir shall have the capacity to maintain the fluid temperature within safe limits to preclude damage to the seals, and the capacity to prevent danger of cavitation. The reservoir shall be equipped with a fluid level gage visible from the operator's station, or a reservoir dipstick may be provided. The reservoir shall be free of foreign matter (mill scale and other particles) prior to filling with hydraulic fluid. Means shall be provided for draining, cleaning the interior, and refilling the reservoir. Filters, having capacity to permit unimpeded flow, shall be installed.

3.5.4.4.1 Hydraulic fluid. Hydraulic fluid conforming to the manufacturer's standard or recommended requirements shall be provided in the hydraulic system. A photoetched, corrosion-resistant caution plate, located near the hydraulic system fill port, shall be furnished stating the type of hydraulic fluid required.

3.5.4.5 Pressure gage. A shock resistant hydraulic pressure gage shall be permanently installed between the pressure (discharge) side of the hydraulic pump and the pressure (inlet) side of the hydraulic cylinders. The gage shall be visible from the operator's station. Provisions, such as T-fitting with plug, shall be made for installing a pressure gage between the outlet side of the hydraulic cylinders and return line to the fluid reservoir.

3.5.4.6 Hydraulic pressure lines and fittings. All hydraulic pressure lines shall be seamless steel hydraulic tubing or wire braid hoses with permanently attached fittings. All fittings shall conform to the rate of flow and pressures required to operate the hydraulic system smoothly and efficiently.

3.5.4.7 Controls. Either manual lever or electric pushbutton type controls shall be provided to regulate the movements of the hopper cover(s), and top hinged discharge door, when furnished. The packer plate hydraulic cylinder control shall embody pack, neutral, and return positions. All controls shall automatically return to neutral position when released. When manual lever type

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controls are furnished, the control movements shall coincide with the packer plate movement if possible. The manual or electrical controls shall be arranged to permit operations from both stations, one at engine platform level, and one at elevated level which permits operator to view movement of packer plate. All controls shall be identified as to function(s).

3.5.5 Sump tank. When specified (see 6.2), a liquid collection tank, of not less than 16 gallon (61 liter (L)) capacity, shall be provided under the body to catch drainage from wet refuse. A large faucet, for handling heavy liquids, shall be provided to drain the tank. Sump tank need not be provided when the same provision is incorporated in the semitrailer body.

3.5.6 Washout system. When specified (see 6.2), a washout system shall be furnished with a reservoir of not less than 80 gallon (303 L) capacity. When compressed air is utilized to provide discharge pressure, reservoir shall be a pressure vessel designed for operating pressure of not less than 100 psi (689 kPa). The air system shall be provided with a safety relief valve, dial pressure gage, air charging valve, and bleed valve.

3.5.7 Access ladders, platforms, handholds, and railings. Access ladders, platforms, and handholds shall be installed at the front of the body to provide access to engine, top of body, and hopper. Platforms shall have nonslip tread surfaces. Railings shall be provided around platform.

3.5.8 Suspension system. The semitrailer shall be furnished with the manufacturer's standard suspension system. Each component of the suspension system shall have a rated capacity at least equal to the imposed load when loaded with its specified payload (see 3.3.4). Clearances shall preclude interference between wheels and with any other part of the semitrailer under the operating conditions specified herein.

3.5.9 Axles. Semitrailer shall be furnished with a tandem axle. Axle ratings shall be at least equal to the load imposed on each axle, measured at the ground when the semitrailer is loaded with the applicable specified payload. The wheel bearings and axle spindles shall be oil lubricated. The oil viscosity shall be in accordance with the manufacturer's recommendations. The hub caps shall have a body and a window for visual determination of oil level. Provision for venting, or equivalent method of withstanding pressures without leakage, and for replenishing the oil supply shall be incorporated.

3.5.10 Wheels, rims and tires.

3.5.10.1 Wheels, rims, and tires. Semitrailer shall be equipped with dual wheels on each axle. The rims and tire ratings shall conform to TRA or ETRTO recommendations for the type and size of tires furnished. Tire size, ply rating, and rim size shall be the same for all wheels on the semitrailer. Tires shall be tubeless type with highway tread. Tires shall be of rated capacity at least equal to the load imposed on each tire, measured at each wheel at the ground, when the semitrailer is loaded with the applicable specified payload. Disk type wheels shall be furnished.

3.5.10.2 Tire carrier. One tire carrier shall be provided and installed under the frame at curb side in an accessible location. Means shall be provided for securing the tire within the carrier to prevent accidental loss.

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3.5.10.3 Spare wheel. When specified (see 6.2), a spare wheel or rim shall be mounted on the tire carrier.

3.5.10.4 Spare tire. When specified (see 6.2), an inflated spare tire shall be mounted on the spare wheel or rim specified in 3.5.10.3. The spare tire shall be of the same size, tread design, and ply rating as tires installed on the semitrailer.

3.5.11 Brakes.

3.5.11.1 Service brakes. Service brakes shall be of the full air type and shall conform to DoT Federal Motor Carrier Safety Regulations, sections 393.45 through 393.47, and 393.52. The braking system shall include automatic slack adjusters, piping, hose connections, gladhands, spring loaded dust covers or dummy gladhands equipped with security chains or cables, and all other components required for a complete air brake system. Gladhands shall conform to SAE J318. Air hose location shall comply with SAE J702. The braking system shall be installed in a manner which provides road clearance for travel over uneven terrain and protection against damage caused by objects striking components. No part of the braking system shall extend below the bottom of wheel rims. The brake linings shall be of the non-asbestos type.

3.5.11.2 Parking brakes. The semitrailer shall be furnished with spring or air diaphragm mechanical lock-type parking brakes. Parking brakes shall conform to DoT Federal Motor Carrier Safety Regulations, section 393.41. The parking brakes shall hold the semitrailer with rated payload on a 10 percent grade despite the depletion of the compressed air supply. The parking brakes shall be automatically applied and shall remain applied without further application.

3.5.12 Upper fifth wheel plate. The upper fifth wheel plate shall be designed for coupling to a full oscillating fore and aft rocking type fifth wheel, shall be of sufficient size to cover a fifth wheel 36 inches (910 mm) in diameter, and shall conform to DoT Federal Motor Carrier Safety Regulations, section 393.70(b). The kingpin shall be of heat treated alloy steel and shall conform to SAE J700. The forward end of the upper fifth wheel plate shall have a turned up lip for ease of loading and for body protection.

3.5.13 Lighting. The electrical lighting system shall be 12-volt (V) potential. At least one pair of brake lights shall override the four-way emergency flasher or the two systems shall be independent of each other. Modifications to the manufacturer's standard product to accommodate this requirement shall not compromise conformance to any Federal Motor Carrier Safety Regulation referenced herein or to any Federal Motor Vehicle Safety Standard. If additional lights are added to the vehicle, the lights shall be selected from the chassis manufacturer's standard matching hardware. The lighting system shall conform to DoT Federal Motor Carrier Safety Regulations, sections 393.9, 393.11, 393.20, 393.22, 393.23, 393.25 through 393.29, 393.32, and 393.33. All lights and reflectors shall be protected from operational hazards by mounting in recessed or otherwise guarded locations. Lights and reflectors shall not be mounted on vertical surface of the rub rails or semitrailer bumpers. The front of the semitrailer shall be equipped with a receptacle conforming to SAE J560, with the receptacle conductors connected and color coded or numbered as specified herein. The receptacle shall be located in accordance with SAE J702. All electrical wiring shall conform to SAE J1292.

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3.5.14 Landing gear. The semitrailer shall have two vertical lift, steel self-leveling sand shoes; telescopic, nonrotating landing legs with 2-speed gears; and a handcrank at the curb side. A holder shall be provided for the handcrank when not in use. The landing gear shall withstand, without deformation, the combined static and dynamic forces due to proportion of gross weight sustained in the forces resulting from impact during coupling and uncoupling operations. When placed in travel position, the landing gear legs shall remain positively locked. The landing gear shall be protected to preclude the entrance of foreign matter which would impair its functioning or mechanical efficiency. The landing gear shall have a range of adjustment to vary the height of the upper fifth wheel from 44 inches (1120 mm) to not less than 50 inches (1270 mm) from the ground. With the semitrailer coupled to a towing tractor and in level position, the clearance under the fully retracted landing gear shall exceed the semitrailer ground clearance but shall in no case be less than 11 inches (280 mm).

3.5.15 Hopper bumpers. When specified (see 6.2), two heavy-duty bumpers shall be provided on each side of the body to protect hopper during loading. One bumper shall be located immediately below the hopper opening and extend the full width of hopper. The other bumper shall be located below the hopper at floor level of semitrailer and be not less than 36 inches (910 mm) in length.

3.5.16 Mirror. When specified (see 6.2), a mirror, not less than 7 inches (180 mm) in diameter, shall be mounted in such a position as to allow viewing of the contents and packer plate movement at hopper area from the engine level operator's station.

3.5.17 Rear end protection. Semitrailer rear end protection shall be in accordance with DoT Federal Motor Carrier Safety Regulations, section 393.86.

3.5.18 Rear wheel splash and stone throw protection. Rear wheels shall have rigid splash shields in front and mud flaps at rear. Splash and stone throw protection shall be in accordance with SAE J682. A metal strip not less than 1/8 inch (3.2 mm) thick and not less than 1 inch (25 mm) wide, extending the entire width of the mud flap, shall be installed to prevent the bolt heads or bolt nuts from damaging the mud flaps. As an alternate method of attaching the mud flaps, tabs or clips with minimum surface contact dimensions of 1 inch (25 mm) high by 1.25 inch (32 mm) wide by 0.094 inch (2.4 mm) thick shall be furnished at each bolt.

3.5.19 Toolbox. The vehicle shall have a tool box. Minimum dimensions shall be 22 inches (560 mm) by 22 inches (560 mm) by 12 inches (300 mm). The door opening shall be not less than 20 inches (510 mm) by 10 inches (250 mm) in size. The tool box shall be made of not less than 12 gage (0.1046 inch (2.657 mm)) steel or of equivalent strength aluminium. The box shall be weatherproof and shall provide for locking with a padlock.

3.5.19.1 Tool box location. The tool box shall be underslung, on the curbside of the vehicle. The tool box shall not reduce the ground clearance or ramp break-over angle of the vehicle, as found before the tool box is mounted.

3.6 Lubrication and chart. Means for lubrication shall be provided for all parts of the semitrailer normally requiring lubrication. Hydraulic lubrication fittings shall be in accordance with SAE J534. Where use of high pressure

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lubricating equipment will damage grease seals or other parts, a suitable warning shall be affixed to the equipment in a conspicuous location. An illustrated or schematic diagram type lubrication chart shall be provided on the semitrailer. The chart shall direct attention to all lubrication fittings and specify the range and grade of lubricants required for critical temperatures. The chart shall be permanently attached to the semitrailer in a readily visible location. The chart shall be inscribed on a plate conforming to composition A (class 1 or 2) or composition C of MIL-P-514.

3.7 Treatment, painting, identification marking, and data plates. As specified by the procuring activity for the appropriate service (see 6.2), treatment, painting, identification marking, and data plates shall be in accordance with MIL-STD-1223. One coat of rust inhibiting primer shall be applied to interior of the body. Interior of body shall be cleaned and properly prepared before applying the primer. Nameplate shall be attached to the right side of the engine housing.

3.8 Rustproofing. The semitrailer shall be rustproofed in accordance with FED-STD-297, except exterior body enclosed areas above the floor line are not required to be rustproofed.

3.9 Servicing and adjusting. Prior to acceptance of the semitrailer by the Government, the contractor shall service and adjust the semitrailer for immediate operational use as required in the operator's manual. The servicing and adjusting shall include at least the following:

- a. Inflation of all tires.
- b. Adjustment of brakes (when required).
- c. Proper functioning of all lighting and electrical systems.
- d. Adjustment of engine to include tune up (when required).
- e. Complete lubrication with grades of lubricants recommended for ambient temperature at the delivery point.
- f. Cooling system filled to capacity with a clean solution of equal parts by volume of water and antifreeze (ethylene glycol).

The semitrailer shall be conspicuously tagged to identify the lubricants and their temperature range.

3.10 Workmanship.

3.10.1 Steel fabrication. The steel used in fabrication shall be free from kinks, sharp bends, and other conditions which would be deleterious to the finished product. Manufacturing processes shall not reduce the strength of the steel to a value less than intended by the design. Manufacturing processes shall be done neatly and accurately. All bends shall be made by controlled means to ensure uniformity of size and shape.

3.10.2 Bolted connections. Bolt holes shall be accurately punched or drilled and shall have the burrs removed. Washers or lockwashers shall be provided in accordance with good commercial practice, and all bolts, nuts, and screws shall be tight.

3.10.3 Riveted connections. Rivet holes shall be accurately punched or drilled and shall have the burrs removed. Rivets shall be driven with pressure

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tools and shall completely fill the holes. Rivet heads, when not countersunk or flattened, shall be of approved shape and uniform size for the same diameter of rivet. Rivet heads shall be full, neatly made, concentric with the rivet holes, and in full contact with the surface of the member.

3.10.4 Welders and welding. All welders employed in the fabrication of the semitrailer shall be certified, before any welding is accomplished, in accordance with MIL-STD-1595; and the welding qualifications of the ASME BPVC, Section IX; or AWS B2.1 or D1.1. The certification that the welders have passed the qualifications test shall be on file at the contractor's facility and shall be available for review by the Government.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this document where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in this document shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Component and material inspection. Components and materials shall be inspected in accordance with all the requirements specified herein and in applicable referenced documents.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First production vehicle inspection (see 4.2.1).
- b. Quality conformance inspection (see 4.2.2).

4.2.1 First production vehicle inspection. The first production vehicle produced under the contract shall be inspected by the contractor at his plant under the direction and in the presence of Government representatives. This inspection shall include the examination of 4.3 and the tests of 4.4. The purpose of the inspection shall be to determine vehicle conformity with the requirements of the contract. Acceptance of the first production vehicle shall not constitute a waiver by the Government of its rights under the provisions of the contract.

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4.2.2 Quality conformance inspection. The quality conformance inspection shall include the examination of 4.3, 4.5, and the packaging inspection of 4.6.

4.3 Examination. Each semitrailer shall be examined for compliance with the requirements specified in section 3 of this document. Any redesign or modification of the contractor's standard product to comply with specified requirements, or any necessary redesign or modification following failure to meet specified requirements shall receive particular attention for adequacy and suitability. This element of inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirement or presence of one or more defects preventing or lessening maximum efficiency shall constitute cause for rejection.

4.4 First production vehicle tests.

4.4.1 Vehicle weight test. Semitrailer shall be weighed to determine net weight, and distribution of net weight on fifth wheel and axles shall be computed using the net weight and the specified payload in accordance with 3.3.4. Calculated imposed loads on fifth wheel and axles shall be utilized to ascertain that the suspension, axles, and tires furnished are of adequate capacity to meet specification requirements, and to determine conformance to 3.3.5.

4.4.2 Road test. The first vehicle for each Contract Line Item Number (CLIN) under contract shall be road tested with and without payload. The road test shall be for the distance required in Table III, corresponding to the number of vehicles being procured under the specific CLIN. The test shall be conducted by the contractor under the direction of Government representatives.

The test shall be conducted over a test course approved by the procuring activity and meeting the requirements of Table IV. The vehicle shall be inspected periodically during and at the completion of the test by the contractor.

TABLE III. Road test distance.

Number of vehicles		Road test distance	
being procured		miles	(km)
1 - 10		100	160
11 - 20		200	320
21 - 30		300	480
31 - 40		400	640
41 - 50		500	800
51 - 100		1000	1600
100 - up		5000	8050

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TABLE IV. Road course requirements.

* Type of road	Road test distance	*

* Dirt	10 percent	*
* Gravel	30 percent	*
* Improved pavement	60 percent	*

4.4.3 Test course. The total test mileage shall be on roads and highways within the general geographic limits of the place of manufacture and adjoining states. Any special highway permits required shall be obtained by the contractor. The course shall be arranged to return the vehicle to the manufacturer's plant at the completion of each 1,000 miles (1600 km), if applicable, or at the completion of the test; otherwise, for inspection and chassis servicing.

4.4.4 Test loads. The semitrailer shall be tested for 80 percent of the mileage with the semitrailer loaded as specified in 3.3.3 and for 20 percent of the mileage with the semitrailer empty. Average speeds during all road tests shall be as close as possible to those specified in 3.4.

4.4.5 Road test failure. The vehicle shall successfully complete the entire test. Failure of the vehicle to successfully complete the test shall be cause for nonacceptance of any of contract quantity, pending correction of deficiencies and evidence of corrective action which shall prevent the recurrence of similar deficiencies in the contract quantity. Failure of the vehicle to successfully complete the test shall not constitute an excusable delay in meeting delivery schedules. The equipment shall be monitored throughout the test for interference with towing operations, and for stability as evidence by poor tracking or uncontrollable sideslipping, skidding, swerving, or tilting. The equipment also shall be monitored for loosening of parts, interference between parts, leakage of fluids or lubricants, overheating of components, damage, permanent distortion, or excessive wear of parts and components. The equipment shall be disassembled to the extent necessary for inspection for unusual wear or damage to components. Substitution of a new semitrailer or replacement of a major component may require complete retest at the discretion of the Government representatives. Rejection of the test semitrailer shall be for damage or deficiencies, included but not limited to the following:

- a. Damage caused by collision.
- b. Failure of any major component.
- c. Vibration due to misalignment of wheels or frame.
- d. Vibration due to the type of construction or mounting.
- e. Evidence of abnormal tire wear due to misalignment or unbalance.
- f. Failure of any vehicular safety device such as brakes or electrical circuits.
- g. Evidence of structural weakness in any part of the vehicle, vehicle components, accessories or welds.
- h. Loose mounting of parts or accessories due to workmanship or vehicular operation.

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4.4.6 Brake test. Brake tests shall be conducted during the road test for conformance. The brake tests shall be conducted with the fully loaded semitrailer coupled to a fully loaded truck tractor. The truck tractor shall have a Gross Vehicle Weight Rating (GVWR) and Gross Combination Weight Rating (GCWR) not exceeding Table V. The truck tractor shall be without excessive brake capacity. The GVWR and GCWR specified in Table V shall be the maximum ratings on the tractor only and not necessarily the actual maximum GVW ratings on the tractor only and not necessarily the actual maximum GVW and GCW of the combination of test vehicles. Failure of the vehicle combination to stop within the required 40 feet (12.2 m) from a speed of 20 mph (32 km/h) shall be cause for rejection.

TABLE V. Maximum tractor characteristics.

*	-----				*
*	Type of	Maximum		Maximum	
*	Trailer	Tractor GVWR		Tractor GCWR	
*		lb	kg	lb	kg
*	-----				*
*					*
*	II	36,000	16 350	50,000	22 700
*	IV	44,000	20 000	65,000	29 500
*	V	40,000	18 100	66,000	30 000
*	-----				*

4.4.7 Turning ability test. The truck-tractor shall be coupled to the semitrailer and driven through turns up to 90 degrees (right and left), to determine conformance to 3.4.1. At the conclusion of the turns in each direction, the tractor and the semitrailer shall be examined for evidence of binding, misalignment or other damage.

4.4.8 Parking brake test. The disconnected semitrailer with rated payload shall be placed on a 10 percent grade, first headed up the grade then headed down the grade. The test shall be conducted to verify the braking requirements of 3.5.11.2.

4.4.9 Landing leg test. The semitrailer shall be disconnected from the towing vehicle and loaded as specified in 3.3.3. The landing legs shall be raised and lowered to vary the height of the upper fifth wheel over the landing gear's full range, to determine conformance to 3.5.13. The loaded semitrailer shall be coupled and uncoupled not less than five times and the landing legs shall be examined for binding and misalignment.

4.4.10 Electrical test. An operational electrical test shall be conducted to determine that all vehicle lights are functioning and in proper order.

4.4.11 Loading and compaction test. The semitrailer shall be tested for loading and compaction operation, and at least the following tests shall be made:

- a. Compaction members, hydraulic system, engine, and controls shall be observed to determine conformance to 3.5.2.5, 3.5.3, and 3.5.4.
- b. The body hopper capacity shall be observed to determine compliance with 3.5.2.1.

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- c. The hopper closing and opening operation shall be timed to determine conformance to 3.5.2.2.
- d. The time required for the packer plate to be actuated through a complete cycle shall be observed to determine conformance to 3.5.2.6(a).

4.4.12 Dumping test. The semitrailer shall be tested for compliance to 3.5.2.4 and 3.5.2.6(d).

4.4.13 Liquid-tight test. Semitrailer shall be loaded with water to a depth of 5 inches (125 mm) to determine liquid-tight capabilities specified in 3.5.2.

4.4.14 Failure. Failure of the first production vehicle to meet requirements of the contract shall be cause for the Government to refuse acceptance of all vehicles under the contract until corrective action has been taken.

4.5 Production sample. Upon acceptance of the first production vehicle, it shall remain at the manufacturing facility as a production sample, and may be the last semitrailer shipped on the contract. The contractor shall maintain the semitrailer in a serviceable condition for the duration of the contract.

4.6 Packaging inspection. The semitrailer shall be inspected to verify conformance to the requirements of section 5.

5. PACKAGING

5.1 Vehicle processing. The vehicle shall be processed for shipment from the manufacturer's plant to the initial receiving activity, in accordance with the manufacturer's standard commercial practice.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The semitrailers are intended for use in collection, transportation, and dispensing of refuse.

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in acquisition documents:

- a. Title, number, and date of this specification
- b. Type of semitrailer required (see 1.2)
- c. Issue of DODISS to be cited in the solicitation and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2)
- e. When hopper opening dimension requirements are other than as specified (see 3.5.2.1)
- f. When hopper cover operation requirement is other than as specified (see 3.5.2.2)
- g. When sump tank is required (see 3.5.5)
- h. When washout system is required (see 3.5.6)
- i. When spare wheel or rim is required (see 3.5.10.3)
- j. When spare tire is required (see 3.5.10.4)

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- k. When hopper bumpers are required (see 3.5.15)
- l. When hopper area viewing mirror is required (see 3.5.16)
- m. Appropriate service requirements for treatment, painting, identification marking, and data plates (see 3.7)

6.3 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (DD Form 1423) incorporated into the contract. When the provisions of DoD Federal Acquisition Regulations (FAR) Supplement, Part 27, Sub-Part 227.405-70 are invoked and the DD Form 1423 is not used, the data should be delivered by the contractor in accordance with the contract or purchase order requirements.

6.4 First production vehicle. The first production vehicle shall be one complete semitrailer or a standard item from the contractor's current inventory. The contracting officer should include specific instructions in all procurement instruments regarding arrangements for examinations, tests, and approval of the first production vehicle.

6.5 Definitions.

6.5.1 Improved road. An improved road is a smooth, hard surfaced road, such as a concrete or asphalt paved highway.

6.5.2 Unimproved road. An unimproved road is an unpaved, unstabilized road with an undulating surface having occasional chuckholes and exposed rocks.

6.6 Type I and III elimination. The type I, single axle, 38 yd³ (29 m³) and type III, tandem axle, 42 yd³ (32 m³) refuse collection semitrailers were eliminated from the specification.

6.7 Subject term (key word) listing.

Engine
Hopper

6.8 Supersession data. This specification replaces military specification MIL-S-45154J dated 28 February 1989.

6.9 Classification cross reference. Cross reference of classification changes between this specification (see 1.2) and the superseded military specification, MIL-S-45154J, are as follows:

MIL-S-45154J	KKK-S-2851
Type I - See 6.6.	Type I - See 6.6.
Type II - Tandem axle, 50 yd ³ (38.2 m ³)	Type II - Tandem axle, 50 yd ³ (38.2 m ³)
Type III - See 6.6.	Type III - See 6.6.
Type IV - Tandem axle, 65 yd ³ (49.6 m ³)	Type IV - Tandem axle, 65 yd ³ (49.6 m ³)
Type V - Tandem axle, 75 yd ³ (57.3 m ³)	Type V - Tandem axle, 75 yd ³ (57.3 m ³)

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MILITARY INTERESTS:
ACTIVITIES:

CIVIL AGENCY COORDINATING

Custodians

GSA - FSS

Army - AT

Navy - YD1

Air Force - 99

PREPARING ACTIVITY:

Navy - YD1

Review Activities

(Project 2330-0138)

Navy - MC

Air Force - 84